REMARKS

I. Claim Rejections under 35 U.S.C. § 102(e)

Claims 29, 31 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2002/0084516 to Efland et al., hereinafter referred to as "Efland".

Regarding claim 29, the Examiner argued that Efland discloses a method for forming a wiring bond bad utilized in wire bonding operations on an integrated circuit (IC) device in FIG. 1, comprising the steps of: initially providing a substrate p sub thereafter configuring substrate to comprise a wiring bond pad 160 comprising only a single metal layer 162 (citing paragraph 0050), wherein the single metal layer comprises a layer comprises of only one type and does not share the layer with any other material, thereafter positioning at least one IC device (citing paragraph 0042) below the wiring bond pad 160 to thereby conserve IC space and improve wiring bond pad efficiency as a result of configuring the wiring bond pad to comprise a single metal later, thereafter locating a buffer 163 and bonding layer 165 immediately above the single metal layer 163; thereafter locating the single metal layer 162 above a plurality of intermetal dielectric layer (IMD) 1312,134 (citing paragraph 043) and thereafter locating at least one IC device 120 below the plurality of IMD layers wherein the single metal layer comprises a metal-8 layer 162, thereby preventing a wiring bond stress-induced fracture in the wiring bond pad.

The Applicants respectfully disagree with this assessment. The Applicants note that in order to succeed in setting forth in rejecting claim under 35 U.S.C. § 102(e) based on a cited reference (e.g., Efland), the cited reference must show every feature and/or step of the rejected claim. If even one feature of the rejected claim is lacking in the cited reference, the cited reference must be withdrawn as a basis for rejecting the claim under 35 U.S.C. § 102(e).

Applicants' claim 29 is directed toward a method for forming a wiring bond pad utilized in wire bonding operations on an integrated circuit device. The method taught by claim 29 comprises the steps of: initially providing a substrate; thereafter configuring said substrate to comprise a wiring bond pad comprising only a single metal layer, wherein said single metal layer comprises a layer comprised of only one type of metal and does not share said layer with any other material; thereafter positioning at least one integrated circuit device below said wiring bond pad to thereby conserve integrated circuit space and improve wiring bond pad efficiency as a result of configuring said wiring bond pad to comprise said single metal layer; thereafter locating a buffer and bonding layer immediately above said single metal layer; thereafter locating said single metal layer above a plurality of intermetal dielectric layers; and thereafter locating said at least one integrated circuit device below said plurality of intermetal dielectric layers, wherein said single metal layer comprises a metal-8 layer, thereby preventing a wiring bond stress-induced facture in said wiring bond pad.

The Examiner argued that reference numeral 160 of Efland refers to a wiring bond pad. The Examiner is incorrect. Reference numeral 160 of Efland does not refer to a wiring bond pad or to a structure that comprises a "single metal layer only". Instead, reference numeral 160 of Efland refers to a "stack 160". Referring to FIG. 1 of Efland, Applicants note that reference numeral 160 specifically refers to a stack 160 composed of layers 163, 164, and 164, rather than a "single metal layer". The word "stack" implies "more than one layer" or "more than one structure". As indicated at paragraph 0050 of Efland: "Via 161 is filled with the first metal layer 162 of layers forming stack 160." Thus reference numeral 160 refers to a plurality of layers. Applicants claim 29, on the other hand, refers to a "wiring bond bad comprises a single metal layer" not a stack composed of multiple layers. Stack 160 is thus not a wiring bond pad composed of a single metal layer, but is instead a structure (i.e., a "stack") composed of multiple layers. Additionally, stack

160 does not function as a wiring bond pad. Stack 160 instead functions as power distribution lines. Paragraph 0049 of Efland states: "...the next process steps comprise the deposition and patterning of power distribution lines 160" rather than any indication of a "wiring bond pad". Thus, reference numeral 160 functions as "distribution lines" rather than a wiring bond pad, and additionally is composed of multiple layers rather than a single metal layer, wherein the single metal layer comprises a layer comprises of only one type and does not share the layer with any other material.

The Examiner further argued that Efland discloses positioning at least one IC device (citing paragraph 0042) below the wiring bond pad 160 to thereby conserve IC space and improve wiring bond pad efficiency as a result of configuring the wiring bond pad to comprise a single metal later. Again, Applicants note that reference numeral 160 does not disclose a "wiring bond pad" but instead refers to a stack of layers 163, 164, and 164, which function as power distribution lines 160 (i.e., see paragraph 0049 of Efland). Additionally, paragraph 0042 cited by the Examiner does not indicate the conservation of IC space. Paragraph 0042 of Efland also does not disclose improving wiring bond pad efficiency as a result of configuring a wiring bond pad to comprise a single metal later (i.e., because the wiring bond pad is not taught or disclosed by paragraph 0042).

Paragraph 0042 of Efland instead refers only to a small portion of an IC fabricated into and on top of a first chip surface 110a. No mention is made in paragraph 0042 of a wiring bond pad or any indication that stack 160 functions as a wiring bond pad in which wiring bond pad efficiency is achieved as a result of configuring the wiring bond pad to comprise a single metal layer. Again, reference numeral 160 does not refer to a single metal layer but is made up of multiple layers 163, 164, and 164.

The Examiner additionally argued that Efland discloses thereafter locating a buffer 163 and bonding layer 165 immediately above the single metal layer 162. Applicants note that this statement contradicts the Examiner's earlier assertion that substrate P comprises a wiring bond pad 160 comprising only a single metal layer, wherein the single metal layer comprises a layer comprised of only one type and does not share the layer with any other material. Instead, reference numeral 160 refers to a stack or structure composed of layers 163, 165 and 162 rather than just a single metal layer that functions as a wiring bond pad. The Examiner argued that reference numeral 160 is a wiring bond pad, but as indicated above, reference numeral 160 refers to a stack and power distribution lines. Efland refers to a structure that includes layers 162, 165 and 162, rather than to a wiring bond pad. In fact Efland does not refer at all to a "bond pad".

The Applicants disagree with the Examiner's assertion that Efland shows locating the single metal layer 162 above a plurality of intermetal dielectric layer (IMD) 1312,134 (citing paragraph 043) and thereafter locating at least one IC device 120 below the plurality of IMD layers wherein the single metal layer comprises a metal-8 layer 162, thereby preventing a wiring bond stress-induced fracture in the wiring bond pad. Neither paragraph 043 or 042 mention "preventing a wiring bond-stress inducted fracture in a wiring bond pad." The ability to prevent a wiring bond-stress inducted fracture in a wiring bond pad is simply not taught or disclosed by paragraphs 043 or 042. The Applicants claim an ability to prevent a wiring bond-stress inducted fracture in a wiring bond pad. Efland does not teach a device with this feature. Additionally, as indicated above, Efland does not teach, suggest, or anticipate a wiring bond pad comprising only a single metal layer, wherein said single metal layer comprises a layer comprised of only one type of metal and does not share said layer with any other material. Instead, the structure 160 that the Examiner argued was a wiring bond pad is made up of more than one layer (i.e., not only one type of metal).

Regarding claim 31, the Examiner argued that Efland discloses a method wherein the metal-8 layers 162 comprise a copper layer (citing paragraph 0050). The Applicants disagree with this assessment. Layer 162 is not a metal-8 layer. In fact, no mention is made in paragraph 0050 of a metal-8 layer. Paragraph 0050 instead refers only to a seed metal layer, but not to a metal-8 layer. Additionally, Applicants point out that all of the arguments presented above against the rejection to claim 29 apply equally to the rejection to claim 31, because claim 31 is dependent upon claim 29.

Based on the foregoing, the Applicants not that the Efland reference does not show and/or teach every feature of Applicants' claims 29 and 31. In order to succeed in rejecting claims 29 and 31 under 35 U.S.C. § 102(e) based on Efland, the cited reference must show every feature and/or step of the rejected claim. As indicated above, Efland does not teach all of the features of claims 29 and 31. Therefore, Applicants respectfully request withdrawal of the above-referenced rejection to claims 29 and 31 under 35 U.S.C. § 102(e).

II. Claim Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 30, 32-40 under 35 U.S.C. § 103(a) as being unpatentable over Efland.

Regarding claim 30, the Examiner admitted that Efland does not expressly disclose the IMD layer comprising at least IMD-1 to IMD-7 layers. The Examiner argued, however, that Efland discloses a method comprising IMD layers 131/134. The Examiner further argued that such an IMD multiplayer is also disclosed in U.S. Patent No. 6,625,882, column 1, lines 15-25. The Examiner therefore argued that it would have been obvious to one of ordinary skill in the art to use the plural IMD layer teaching of Efland in the number of layer as claimed, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is

not inventive to discover the optimum or workable range by routine experimentation.

The Applicants respectfully disagree with this assessment and note that the arguments presented above with respect to the rejection to claims 29 and 31 apply equally to the rejection to claims 30, 32-40 under 35 U.S.C. § 103(a). Applicants note that reference numerals 131 and 134 are not referred to by Efland as constituting IMD layers. The acronym IMD refers to "inter metal dielectric". Instead, reference numeral 134 constitutes a "second interlevel insulator layer" rather than an IMD layer (i.e., see paragraph 0044 of Efland). Additionally, reference numeral 131 refers to an "insulator layer" (i.e., see paragraph 0045 of Efland) rather than IMD layer. Additionally, Efland does not teach "at least IMD-1 to IMD-7" layers, which constitutes at a minimum, seven IMD layers, which is an essential teaching of claim 30, and contributes to the unique advantage of Applicants' invention, rather than merely a feature obtained by "optimum or workable range by routine experimentation". Applicants' specification does not in fact indicate that IMD-1 to IMD-7 layers constitute a feature obtained by "optimum or workable range by routine experimentation". The Examiner has not properly explained how or why IMD-1 to IMD-7 layers constitute a feature obtained by "optimum or workable range by routine experimentation".

Regarding claim 32, the Examiner argued that Efland discloses a method for forming a wiring bond pad utilized in wire bonding operations on an integrated circuit (IC) device comprising the steps of: providing a substrate P sub, thereafter configuring the substrate to comprise a wiring bond pad 160 to comprise a single metal layer 162, wherein the single metal layer does not share the single metal layer with any other material, thereafter locating at least one IC device 120 below the wiring bond pad 160, to thereby conserve IC space and improve wiring bond pad efficiency as a result of configuring the wiring bond pad to comprise a single metal layer 162, thereafter locating a buffer 164 and bonding layer 165 immediately

above the single metal layer 162; thereafter locating the single metal layer 162 above a plurality of IMD layers 131/134, and thereafter locating at least one IC device 120 below the plurality of IMD layers, wherein the single metal layer comprises a metal-8 layer of copper (citing paragraph 0050), thereafter forming a layer metal layer 165 (citing paragraph 0052) above the single metal layer 162 comprising a buffer 164 and bonding layer 165, thereby preventing a wiring bond stress-induced fracture in wiring bond pad 160.

The Examiner argued that reference numeral 160 of Efland refers to a wiring bond pad. The Examiner is incorrect. Reference numeral 160 of Efland does not refer to a wiring bond pad or to a structure that comprises a "single metal layer only". Instead, reference numeral 160 of Efland refers to a "stack 160". Referring to FIG. 1 of Efland, Applicants note that reference numeral 160 specifically refers to a stack 160 composed of layers 163, 164, and 164, rather than a "single metal layer". The word "stack" implies "more than one layer" or "more than one structure". As indicated at paragraph 0050 of Efland: "Via 161 is filled with the first metal layer 162 of layers forming stack 160." Thus reference numeral 160 refers to a plurality of layers. Applicants claim 29, on the other hand, refers to a "wiring bond bad comprises a single metal layer" not a stack composed of multiple layers. Stack 160 is thus not a wiring bond pad composed of a single metal layer, but is instead a structure (i.e., a "stack") composed of multiple layers.

Additionally, stack 160 does not function as a wiring bond pad. Stack 160 instead functions as power distribution lines. Paragraph 0049 of Efland states: "...the next process steps comprise the deposition and patterning of power distribution lines 160" rather than any indication of a "wiring bond pad". Thus, reference numeral 160 functions as "distribution lines" rather than a wiring bond pad, and additionally is composed of multiple layers rather than a single metal layer, wherein the single metal layer comprises a layer comprises of only one type and does not share the layer with any other material.

The Examiner further argued that Efland discloses positioning at least one IC device (citing paragraph 0042) below the wiring bond pad 160 to thereby conserve IC space and improve wiring bond pad efficiency as a result of configuring the wiring bond pad to comprise a single metal later. Again, Applicants note that reference numeral 160 does not disclose a "wiring bond pad" but instead refers to a stack of layers 163, 164, and 164, which function as power distribution lines 160 (i.e., see paragraph 0049 of Efland). Additionally, paragraph 0042 cited by the Examiner does not indicate the conservation of IC space. Paragraph 0042 of Efland also does not disclose improving wiring bond pad efficiency as a result of configuring a wiring bond pad to comprise a single metal later (i.e., because the wiring bond pad is not taught or disclosed by paragraph 0042).

Paragraph 0042 of Efland instead refers only to a small portion of an IC fabricated into and on top of a first chip surface 110a. No mention is made in paragraph 0042 of a wiring bond pad or any indication that stack 160 functions as a wiring bond pad in which wiring bond pad efficiency is achieved as a result of configuring the wiring bond pad to comprise a single metal layer. Again, reference numeral 160 does not refer to a single metal layer but is made up of multiple layers 163, 164, and 164.

The Examiner additionally argued that Efland discloses thereafter locating a buffer 163 and bonding layer 165 immediately above the single metal layer 162. Applicants note that this statement contradicts the Examiner's earlier assertion that substrate P comprises a wiring bond pad 160 comprising only a single metal layer, wherein the single metal layer comprises a layer comprised of only one type and does not share the layer with any other material. Instead, reference numeral 160 refers to a stack or structure composed of layers 163, 165 and 162 rather than just a single metal layer that functions as a wiring bond pad. The Examiner argued that reference numeral 160 is a wiring bond pad, but as indicated above, reference

numeral 160 refers to a stack and power distribution lines. Efland refers to a structure that includes layers 162, 165 and 162, rather than to a wiring bond pad. In fact Efland does not refer at all to a "bond pad".

The Applicants disagree with the Examiner's assertion that Efland shows locating the single metal layer 162 above a plurality of intermetal dielectric layer (IMD) 1312,134 (citing paragraph 043) and thereafter locating at least one IC device 120 below the plurality of IMD layers wherein the single metal layer comprises a metal-8 layer 162, thereby preventing a wiring bond stress-induced fracture in the wiring bond pad. Neither paragraph 043 or 042 mention "preventing a wiring bond-stress inducted fracture in a wiring bond pad." The ability to prevent a wiring bond-stress inducted fracture in a wiring bond pad is simply not taught or disclosed by paragraphs 043 or 042. The Applicants claim an ability to prevent a wiring bond-stress inducted fracture in a wiring bond pad. Efland does not teach a device with this feature. Additionally, as indicated above, Efland does not teach, suggest, or anticipate a wiring bond pad comprising only a single metal layer, wherein said single metal layer comprises a layer comprised of only one type of metal and does not share said layer with any other material. Instead, the structure 160 that the Examiner argued was a wiring bond pad is made up of more than one layer (i.e., not only one type of metal).

The Examiner admitted that Efland does not expressly disclose the metal layer 163 comprising aluminum. The Examiner argued, however, that Efland discloses layer 164 as a metal stress-absorbing layer comprising nickel (citing paragraph 0052). The Examiner therefore argued that at the time the invention was made, it would have been obvious to one of ordinary skill in the art to replace the copper stress absorbing teaching of Efland with aluminum, asserting that the metal teaching of Efland would have included copper or aluminum and that it would have provided the same stress-absorbing function. The Applicants respectfully disagree with this assessment. The Examiner is taking a leap in suggesting that

aluminum provides the same stress-absorbing function as nickel. Nickel does not teach or suggest aluminum.

The aluminum feature of Applicants' claim 32 is based on the step of thereafter forming a layer of aluminum film above said single metal layer, wherein said layer of aluminum film above said single metal layer comprises a buffer and bonding layer, thereby preventing a wiring bond stress-induced facture in said wiring bond pad. As indicated above, Efland does not teach a wiring bond pad nore one based on a structure for preventing wiring bond stress-induced fractures in the wiring bond pad. Efland does not indicate that layer 164 reduces wiring bond stress-induced fractures, only that layer 164 is a stress-absorbing layer.

The Examiner further asserted that the recitation of "preventing a wiring bond stress-induced fracturing in a wiring bond pad" is only a statement of the functional properties of the bond pad. The Examiner argued that when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. The Examiner further argued in the alternative that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. As indicated above, however, the structure of Efland is not identical or substantially identical in structure or composition to that of Applicants' invention. Therefore, the Examiner has not established a prima facie case of either anticipation or obviousness

Regarding claims 33-38, the Examiner argued that Efland discloses the metal film 164 formed above the single metal layer 162 having a thickness in a range of 10KÅ - 50KÅ (citing paragraph 0052) and wherein the single metal layer 162 comprises a copper layer having a thickness of approximately 2-5KÅ (citing paragraph 0050). The Examiner therefore argued that it would have been obvious

to one of ordinary skill in the art to use the metal stress absorbing layer teaching of Efland in the range as claimed, because it has been held that it is not inventive to discover the optimum or workable range by routine experimentation. The Applicants note that such an argument is moot in light of the fact that the fundamental features of Applicants' invention (i.e., wiring bond pad) are not taught, disclosed or suggested by Efland (i.e., see the arguments presented above with respect to the rejection to claims 29, 31 under 35 U.S.C. § 102(e), which apply equally to the rejection to claims 33-38 under 35 U.S.C. § 103.

Regarding claims 39-40, the Examiner argued that as discussed above with respect to claims 29-38, Efland discloses all of the limitations of claims 39-40. Applicants argue that the arguments presented above with respect to the rejection to claims 30, 32-38 under 35 U.S.C. § 103(a) apply equally to the aforementioned rejection to claims 39-40.

The Applicants also remind the Examiner that the language of the Efland references may not taken out of context and modified without motivation, in effect producing the words of the claims (and sometimes, not even the words or concepts of the claims), without their meaning or context. A resultant modification of Efland would not yield the invention as claimed. The claims are rejected under 35 U.S.C. §103(a) and no showing has been made to provide the motivation as to why one of skill in the art would be motivated to modify the Efland reference, and further fails to provide the teachings necessary to fill the gaps in the Efland in order to yield the invention as claimed.

The rejections under 35 U.S.C. §103(a) have provided no more motivation than to simply point out the individual words of the Applicant's claims among the Efland reference. Without a basis and reason for rejections to Applicant's claims and specification (e.g., without reason as to why and how the references could be combined and/or modified to provide the Applicant's invention as claimed), the

Examiner's analysis may be viewed as incorporating the benefit of hindsight. Hindsight cannot be a basis for providing motivation, and is not sufficient to meet the burden of sustaining a 35 U.S.C. §103(a) rejection.

Thus, claims 30, 32-40 of the present invention are not taught or suggested by Efland. The features and structures of Efland cited herein by the Examiner either fail to teach or yield the invention as claimed. Efland fails to teach or suggest all the elements of Applicants' claims. Further, one of skill in the art would not be motivated to modify Efland to produce Applicants' claims. Therefore, the present invention is not obvious in light of Efland and/or any other well-known components. Withdrawal of the §103(a) rejection is therefore respectfully requested.

III. Final Rejection

The Applicants note that in the Office Action dated May 18, 2004, the Examiner indicated that the action was made final. However, the Examiner noted that that Applicant's previous amendment necessitated new ground(s) of rejection, which are repeated herein. Such grounds are based on the Efland reference, which was not brought up previously as an issue with respect to prior office actions related to this patent application.

Before a final rejection is in order, a clear issue should be developed between the Examiner and Applicant. Applicants believe that a clear issue has not been developed because of the new grounds of rejection set forth in the prior office action, which are based on a reference (i.e., Efland), which was not raised as in issue with respect to any previous action. To bring the prosecution to as speedy conclusion as possible and at the same time to deal justly by both the Applicant and the public, the invention as disclosed and claimed should be thoroughly searched in the first action and the references fully applied. Switching from one subject matter to another in the claims presented by applicant in successive amendments, or from one set of references to another by the examiner in rejecting in successive actions

claims of substantially the same subject matter, however, will alike tend to defeat attaining the goal of reaching a clearly defined issue for an early termination, i.e., either an allowance of the application or a final rejection. (See MPEP 706.07) Applicants thus believe that the rejection set forth in the office action dated May 18, 2004 should not have been filed because new grounds for rejections were set forth in the office action dated May 18, 2004. Applicants therefore request withdrawal of the finality of the rejections set forth in the previous office action.

III. Conclusion

In view of the foregoing discussion, Applicants have responded to each and every rejection of the Official Action, and respectfully request that a timely Notice of Allowance be issued. Applicants have clarified the structural distinctions of the present Invention. Applicants respectfully submit that the foregoing discussion does not present new issues for consideration and that no new search is necessitated. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. 103(e) and 103(a), and further examination of the present application.

Should there be any outstanding matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned representative to conduct an interview in an effort to expedite prosecution in connection with the present application.

Respectfully submitted,

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